

Claims

What is claimed is:

1. An isolated nucleic acid comprising a polynucleotide encoding a chitinase polypeptide, wherein the chitinase polypeptide is selected from the group consisting of a polypeptide at least 90% identical to SEQ ID NO: 4, a polypeptide at least 89% identical to SEQ ID NO: 6, a polypeptide at least 91% identical to SEQ ID NO: 8, a polypeptide at least 88% identical to SEQ ID NO: 10, a polypeptide at least 91% identical to SEQ ID NO: 12, a polypeptide at least 89% identical to SEQ ID NO: 14, a polypeptide at least 87% identical to SEQ ID NO: 16, a polypeptide at least 96% identical to SEQ ID NO: 22, a polypeptide at least 90% identical to SEQ ID NO: 24, a polypeptide at least 89% identical to SEQ ID NO: 26, a polypeptide at least 92% identical to SEQ ID NO: 28, a polypeptide at least 92% identical to SEQ ID NO: 30, a polypeptide at least 95% identical to SEQ ID NO: 32, a polypeptide at least 92% identical to SEQ ID NO: 34, a polypeptide at least 95% identical to SEQ ID NO: 36, a polypeptide at least 93% identical to SEQ ID NO: 38, a polypeptide at least 90% identical to SEQ ID NO: 40, a polypeptide at least 90% identical to SEQ ID NO: 42, a polypeptide at least 96% identical to SEQ ID NO: 44, a polypeptide at least 94% identical to SEQ ID NO: 46, a polypeptide at least 95% identical to SEQ ID NO: 48, a polypeptide at least 96% identical to SEQ ID NO: 50, a polypeptide at least 99% identical to SEQ ID NO: 52, a polypeptide at least 95% identical to SEQ ID NO: 54, a polypeptide at least 95% identical to SEQ ID NO: 56, a polypeptide at least 93% identical to SEQ ID NO: 58, a polypeptide at least 93% identical to SEQ ID NO: 60, a polypeptide at least 93% identical to SEQ ID NO: 62, a polypeptide at least 93% identical to SEQ ID NO: 64, a polypeptide at least 93% identical to SEQ ID NO: 66, a polypeptide at least 91% identical to SEQ ID NO: 68, a polypeptide at least 92% identical to SEQ ID NO: 70, a polypeptide at least 90% identical to SEQ ID NO: 72, a polypeptide at least 89% identical to SEQ ID NO: 74, a polypeptide at least 89% identical to SEQ ID NO: 76, a polypeptide at least 93% identical to SEQ ID NO: 78, a polypeptide at least 91% identical to SEQ ID NO: 80, a polypeptide at least 92% identical to SEQ ID NO: 82, and a polypeptide at least 91% identical to SEQ ID NO: 84.
2. The nucleic acid of claim 1, wherein the chitinase polypeptide exhibits a chitinase activity of at least 20% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

3. The nucleic acid of claim 1, wherein the chitinase polypeptide exhibits a chitinase activity of at least 200% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

4. The nucleic acid of claim 1, wherein the chitinase polypeptide has an amino acid sequence that, when optimally aligned with SEQ ID NO: 70 comprises one or more amino acid residues selected from the group consisting of serine at position 79, serine at position 83, valine at position 85, lysine at position 86, glutamine at position 97, glutamine at position 99, isoleucine at position 124, aspartic acid at position 219, isoleucine at position 230, and arginine at position 238, wherein the positions correspond to those in SEQ ID NO: 70.

5. The nucleic acid of claim 4, wherein the chitinase polypeptide exhibits a chitinase activity of at least 20% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

6. The nucleic acid of claim 4, wherein the chitinase polypeptide exhibits a chitinase activity of at least 200% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

7. An isolated nucleic acid comprising a polynucleotide encoding a chitinase polypeptide, wherein the chitinase polypeptide is selected from the group consisting of SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 22, SEQ ID NO: 24, SEQ ID NO: 26, SEQ ID NO: 28, SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 34, SEQ ID NO: 36, SEQ ID NO: 38, SEQ ID NO: 40, SEQ ID NO: 42, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 48, SEQ ID NO: 50, SEQ ID NO: 52, SEQ ID NO: 54, SEQ ID NO: 56, SEQ ID NO: 58, SEQ ID NO: 60, SEQ ID NO: 62, SEQ ID NO: 64, SEQ ID NO: 66, SEQ ID NO: 68, SEQ ID NO: 70, SEQ ID NO: 72, SEQ ID NO: 74, SEQ ID NO: 76, SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 82, and SEQ ID NO: 84.

8. The nucleic acid of claim 7, wherein the chitinase polypeptide exhibits a chitinase activity at least 20% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

9. The nucleic acid of claim 7, wherein the chitinase polypeptide exhibits a chitinase activity at least 200% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

10. An isolated nucleic acid comprising a polynucleotide encoding a chitinase polypeptide, wherein the polynucleotide is selected from the group consisting of SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25, SEQ ID NO: 27, SEQ ID NO: 29, SEQ ID NO: 31, SEQ ID NO: 33, SEQ ID NO: 35, SEQ ID NO: 37, SEQ ID NO: 39, SEQ ID NO: 41, SEQ ID NO: 43, SEQ ID NO: 45, SEQ ID NO: 47, SEQ ID NO: 49, SEQ ID NO: 51, SEQ ID NO: 53, SEQ ID NO: 55, SEQ ID NO: 57, SEQ ID NO: 59, SEQ ID NO: 61, SEQ ID NO: 63, SEQ ID NO: 65, SEQ ID NO: 67, SEQ ID NO: 69, SEQ ID NO: 71, SEQ ID NO: 73, SEQ ID NO: 75, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 81, and SEQ ID NO: 83.

11. The nucleic acid of claim 10, wherein the chitinase polypeptide exhibits a chitinase activity of at least 20% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

12. The nucleic acid of claim 10, wherein the chitinase polypeptide exhibits a chitinase activity of at least 200% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

13. A vector comprising the nucleic acid of claim 10.

14. An isolated nucleic acid comprising a chitinase polynucleotide encoding a polypeptide with chitinase activity, wherein the polynucleotide specifically hybridizes following a final wash in 0.1X SSC at 60° C for 30 minutes to a probe polynucleotide selected from the group consisting of SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25, SEQ ID NO: 27, SEQ ID NO: 29, SEQ ID NO: 31, SEQ ID NO: 33, SEQ ID NO: 35, SEQ ID NO: 37, SEQ ID NO: 39, SEQ ID NO: 41, SEQ ID NO: 43, SEQ ID NO: 45, SEQ ID NO: 47, SEQ ID NO: 49, SEQ ID NO: 51, SEQ ID NO: 53, SEQ ID NO: 55, SEQ ID NO: 57, SEQ ID NO: 59, SEQ ID NO: 61, SEQ ID NO: 63, SEQ ID NO: 65, SEQ ID NO: 67, SEQ ID NO: 69, SEQ ID NO: 71, SEQ ID NO: 73, SEQ ID NO: 75, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 81, and SEQ ID NO: 83, with the proviso that the chitinase polynucleotide does not encode SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 17, SEQ ID NO: 18, SEQ ID NO: 19 or SEQ ID NO: 20.

15. The nucleic acid of claim 14, wherein the polypeptide exhibits a chitinase activity of at least 20% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

16. The nucleic acid of claim 14, wherein the polypeptide exhibits a chitinase activity of at least 200% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

17. An isolated chitinase polypeptide selected from the group consisting of SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 22, SEQ ID NO: 24, SEQ ID NO: 26, SEQ ID NO: 28, SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 34, SEQ ID NO: 36, SEQ ID NO: 38, SEQ ID NO: 40, SEQ ID NO: 42, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 48, SEQ ID NO: 50, SEQ ID NO: 52, SEQ ID NO: 54, SEQ ID NO: 56, SEQ ID NO: 58, SEQ ID NO: 60, SEQ ID NO: 62, SEQ ID NO: 64, SEQ ID NO: 66, SEQ ID NO: 68, SEQ ID NO: 70, SEQ ID NO: 72, SEQ ID NO: 74, SEQ ID NO: 76, SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 82, and SEQ ID NO: 84.

18. The isolated polypeptide of claim 17, wherein the polypeptide exhibits a chitinase activity of at least 20% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

19. The isolated polypeptide of claim 17, wherein the polypeptide exhibits a chitinase activity of at least 200% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

20. An isolated chitinase polypeptide selected from the group consisting of a polypeptide at least 90% identical to SEQ ID NO: 4, a polypeptide at least 89% identical to SEQ ID NO: 6, a polypeptide at least 91% identical to SEQ ID NO: 8, a polypeptide at least 88% identical to SEQ ID NO: 10, a polypeptide at least 91% identical to SEQ ID NO: 12, a polypeptide at least 89% identical to SEQ ID NO: 14, a polypeptide at least 87% identical to SEQ ID NO: 16, a polypeptide at least 96% identical to SEQ ID NO: 22, a polypeptide at least 90% identical to SEQ ID NO: 24, a polypeptide at least 89% identical to SEQ ID NO: 26, a polypeptide at least 92% identical to SEQ ID NO: 28, a polypeptide at least 92% identical to SEQ ID NO: 30, a polypeptide at least 95% identical to SEQ ID NO: 32, a polypeptide at least 92% identical to SEQ ID NO: 34, a polypeptide at least 95% identical to SEQ ID NO: 36, a polypeptide at least 93% identical to SEQ ID NO: 38, a polypeptide at least 90% identical to

SEQ ID NO: 40, a polypeptide at least 90% identical to SEQ ID NO: 42, a polypeptide at least 96% identical to SEQ ID NO: 44, a polypeptide at least 94% identical to SEQ ID NO: 46, a polypeptide at least 95% identical to SEQ ID NO: 48, a polypeptide at least 96% identical to SEQ ID NO: 50, a polypeptide at least 99% identical to SEQ ID NO: 52, a polypeptide at least 95% identical to SEQ ID NO: 54, a polypeptide at least 95% identical to SEQ ID NO: 56, a polypeptide at least 93% identical to SEQ ID NO: 58, a polypeptide at least 93% identical to SEQ ID NO: 60, a polypeptide at least 93% identical to SEQ ID NO: 62, a polypeptide at least 93% identical to SEQ ID NO: 64, a polypeptide at least 93% identical to SEQ ID NO: 66, a polypeptide at least 91% identical to SEQ ID NO: 68, a polypeptide at least 92% identical to SEQ ID NO: 70, a polypeptide at least 90% identical to SEQ ID NO: 72, a polypeptide at least 89% identical to SEQ ID NO: 74, a polypeptide at least 89% identical to SEQ ID NO: 76, a polypeptide at least 93% identical to SEQ ID NO: 78, a polypeptide at least 91% identical to SEQ ID NO: 80, a polypeptide at least 92% identical to SEQ ID NO: 82, and a polypeptide at least 91% identical to SEQ ID NO: 84.

21. The isolated chitinase polypeptide of claim 20, wherein the polypeptide exhibits a chitinase activity at least 20% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

22. The isolated chitinase polypeptide of claim 20, wherein the polypeptide exhibits a chitinase activity at least 200% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

23. The isolated chitinase polypeptide of claim 20, wherein the chitinase polypeptide has an amino acid sequence that, when optimally aligned with SEQ ID NO: 70 comprises one or more amino acid residues selected from the group consisting of serine at position 79, serine at position 83, valine at position 85, lysine at position 86, glutamine at position 97, glutamine at position 99, isoleucine at position 124, aspartic acid at position 219, isoleucine at position 230, and arginine at position 238, wherein the positions correspond to those in SEQ ID NO: 70.

24. The isolated chitinase polypeptide of claim 23, wherein the polypeptide exhibits a chitinase activity at least 20% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

25. The isolated chitinase polypeptide of claim 23, wherein the polypeptide exhibits a chitinase activity at least 200% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

26. An antibody capable of specifically binding an isolated polypeptide selected from the group consisting of SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 22, SEQ ID NO: 24, SEQ ID NO: 26, SEQ ID NO: 28, SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 34, SEQ ID NO: 36, SEQ ID NO: 38, SEQ ID NO: 40, SEQ ID NO: 42, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 48, SEQ ID NO: 50, SEQ ID NO: 52, SEQ ID NO: 54, SEQ ID NO: 56, SEQ ID NO: 58, SEQ ID NO: 60, SEQ ID NO: 62, SEQ ID NO: 64, SEQ ID NO: 66, SEQ ID NO: 68, SEQ ID NO: 70, SEQ ID NO: 72, SEQ ID NO: 74, SEQ ID NO: 76, SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 82, and SEQ ID NO: 84.

27. A plant comprising a recombinant expression cassette comprising a promoter operably linked to a polynucleotide encoding a chitinase polypeptide having chitinase activity, wherein the polypeptide is selected from the group consisting of SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 22, SEQ ID NO: 24, SEQ ID NO: 26, SEQ ID NO: 28, SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 34, SEQ ID NO: 36, SEQ ID NO: 38, SEQ ID NO: 40, SEQ ID NO: 42, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 48, SEQ ID NO: 50, SEQ ID NO: 52, SEQ ID NO: 54, SEQ ID NO: 56, SEQ ID NO: 58, SEQ ID NO: 60, SEQ ID NO: 62, SEQ ID NO: 64, SEQ ID NO: 66, SEQ ID NO: 68, SEQ ID NO: 70, SEQ ID NO: 72, SEQ ID NO: 74, SEQ ID NO: 76, SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 82, and SEQ ID NO: 84.

28. The plant of claim 27, wherein the chitinase polypeptide exhibits a chitinase activity of at least 20% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

29. The plant of claim 27, wherein the chitinase polypeptide exhibits a chitinase activity of at least 200% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

30. The plant of claim 27, wherein the plant is maize.

31. A plant comprising a recombinant expression cassette comprising a promoter operably linked to a polynucleotide encoding a chitinase polypeptide having chitinase activity, wherein the polypeptide is selected from the group consisting of a polypeptide at least 90% identical to SEQ ID NO: 4, a polypeptide at least 89% identical to SEQ ID NO: 6, a polypeptide

at least 91% identical to SEQ ID NO: 8, a polypeptide at least 88% identical to SEQ ID NO: 10, a polypeptide at least 91% identical to SEQ ID NO: 12, a polypeptide at least 89% identical to SEQ ID NO: 14, a polypeptide at least 87% identical to SEQ ID NO: 16, a polypeptide at least 96% identical to SEQ ID NO: 22, a polypeptide at least 90% identical to SEQ ID NO: 24, a polypeptide at least 89% identical to SEQ ID NO: 26, a polypeptide at least 92% identical to SEQ ID NO: 28, a polypeptide at least 92% identical to SEQ ID NO: 30, a polypeptide at least 95% identical to SEQ ID NO: 32, a polypeptide at least 92% identical to SEQ ID NO: 34, a polypeptide at least 95% identical to SEQ ID NO: 36, a polypeptide at least 93% identical to SEQ ID NO: 38, a polypeptide at least 90% identical to SEQ ID NO: 40, a polypeptide at least 90% identical to SEQ ID NO: 42, a polypeptide at least 96% identical to SEQ ID NO: 44, a polypeptide at least 94% identical to SEQ ID NO: 46, a polypeptide at least 95% identical to SEQ ID NO: 48, a polypeptide at least 96% identical to SEQ ID NO: 50, a polypeptide at least 99% identical to SEQ ID NO: 52, a polypeptide at least 95% identical to SEQ ID NO: 54, a polypeptide at least 95% identical to SEQ ID NO: 56, a polypeptide at least 93% identical to SEQ ID NO: 58, a polypeptide at least 93% identical to SEQ ID NO: 60, a polypeptide at least 93% identical to SEQ ID NO: 62, a polypeptide at least 93% identical to SEQ ID NO: 64, a polypeptide at least 93% identical to SEQ ID NO: 66, a polypeptide at least 91% identical to SEQ ID NO: 68, a polypeptide at least 92% identical to SEQ ID NO: 70, a polypeptide at least 90% identical to SEQ ID NO: 72, a polypeptide at least 89% identical to SEQ ID NO: 74, a polypeptide at least 89% identical to SEQ ID NO: 76, a polypeptide at least 93% identical to SEQ ID NO: 78, a polypeptide at least 91% identical to SEQ ID NO: 80, a polypeptide at least 92% identical to SEQ ID NO: 82, and a polypeptide at least 91% identical to SEQ ID NO: 84.

32. The plant of claim 31, wherein the chitinase polypeptide exhibits a chitinase activity of at least 20% of the chitinase activity of chitinase A (SEQ ID NO: 1).

33. The plant of claim 31, wherein the chitinase polypeptide exhibits a chitinase activity of at least 200% of the chitinase activity of chitinase A (SEQ ID NO: 1).

34. The plant of claim 31, wherein the plant is maize.

35. The plant of claim 31, wherein the chitinase polypeptide has an amino acid sequence that, when optimally aligned with SEQ ID NO: 70 comprises one or more amino acid

residues selected from the group consisting of serine at position 79, serine at position 83, valine at position 85, lysine at position 86, glutamine at position 97, glutamine at position 99, isoleucine at position 124, aspartic acid at position 219, isoleucine at position 230, and arginine at position 238, wherein the positions correspond to those in SEQ ID NO: 70.

36. The plant of claim 35, wherein the chitinase polypeptide exhibits a chitinase activity of at least 20% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

37. The plant of claim 35, wherein the chitinase polypeptide exhibits a chitinase activity of at least 200% of the chitinase activity of maize chitinase A (SEQ ID NO: 1).

38. A method of enhancing plant resistance to a fungus, the method comprising,
a) introducing into a plant a recombinant expression cassette comprising a promoter operably linked to a polynucleotide encoding a chitinase polypeptide having chitinase activity, wherein the polypeptide is selected from the group consisting of SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 22, SEQ ID NO: 24, SEQ ID NO: 26, SEQ ID NO: 28, SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 34, SEQ ID NO: 36, SEQ ID NO: 38, SEQ ID NO: 40, SEQ ID NO: 42, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 48, SEQ ID NO: 50, SEQ ID NO: 52, SEQ ID NO: 54, SEQ ID NO: 56, SEQ ID NO: 58, SEQ ID NO: 60, SEQ ID NO: 62, SEQ ID NO: 64, SEQ ID NO: 66, SEQ ID NO: 68, SEQ ID NO: 70, SEQ ID NO: 72, SEQ ID NO: 74, SEQ ID NO: 76, SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 82, and SEQ ID NO: 84; and
b) selecting a plant with enhanced resistance to a fungus.

39. The method of claim 38, wherein the plant is maize.

40. The method of claim 38, wherein the fungus is from the genus *Fusarium*.

41. A method of enhancing plant resistance to a fungus, the method comprising,
a) introducing into a plant a recombinant expression cassette comprising a promoter operably linked to a polynucleotide encoding a chitinase polypeptide having chitinase activity, wherein the polypeptide is selected from the group consisting of a polypeptide at least 90% identical to SEQ ID NO: 4, a polypeptide at least 89% identical to SEQ ID NO: 6, a polypeptide at least 91% identical to SEQ ID NO: 8, a polypeptide at least 88% identical to SEQ ID NO: 10,

a polypeptide at least 91% identical to SEQ ID NO: 12, a polypeptide at least 89% identical to SEQ ID NO: 14, a polypeptide at least 87% identical to SEQ ID NO: 16, a polypeptide at least 96% identical to SEQ ID NO: 22, a polypeptide at least 90% identical to SEQ ID NO: 24, a polypeptide at least 89% identical to SEQ ID NO: 26, a polypeptide at least 92% identical to SEQ ID NO: 28, a polypeptide at least 92% identical to SEQ ID NO: 30, a polypeptide at least 95% identical to SEQ ID NO: 32, a polypeptide at least 92% identical to SEQ ID NO: 34, a polypeptide at least 95% identical to SEQ ID NO: 36, a polypeptide at least 93% identical to SEQ ID NO: 38, a polypeptide at least 90% identical to SEQ ID NO: 40, a polypeptide at least 90% identical to SEQ ID NO: 42, a polypeptide at least 96% identical to SEQ ID NO: 44, a polypeptide at least 94% identical to SEQ ID NO: 46, a polypeptide at least 95% identical to SEQ ID NO: 48, a polypeptide at least 96% identical to SEQ ID NO: 50, a polypeptide at least 99% identical to SEQ ID NO: 52, a polypeptide at least 95% identical to SEQ ID NO: 54, a polypeptide at least 95% identical to SEQ ID NO: 56, a polypeptide at least 93% identical to SEQ ID NO: 58, a polypeptide at least 93% identical to SEQ ID NO: 60, a polypeptide at least 93% identical to SEQ ID NO: 62, a polypeptide at least 93% identical to SEQ ID NO: 64, a polypeptide at least 93% identical to SEQ ID NO: 66, a polypeptide at least 91% identical to SEQ ID NO: 68, a polypeptide at least 92% identical to SEQ ID NO: 70, a polypeptide at least 90% identical to SEQ ID NO: 72, a polypeptide at least 89% identical to SEQ ID NO: 74, a polypeptide at least 89% identical to SEQ ID NO: 76, a polypeptide at least 93% identical to SEQ ID NO: 78, a polypeptide at least 91% identical to SEQ ID NO: 80, a polypeptide at least 92% identical to SEQ ID NO: 82, and a polypeptide at least 91% identical to SEQ ID NO: 84; and

b) selecting a plant with enhanced resistance for a fungus.

42. The method of claim 41, wherein the plant is maize.

43. The method of claim 41, wherein the fungus is from the genus *Fusarium*.

44. The method of claim 41, wherein the chitinase polypeptide has an amino acid sequence that, when optimally aligned with SEQ ID NO: 70 comprises one or more amino acid residues selected from the group consisting of serine at position 79, serine at position 83, valine at position 85, lysine at position 86, glutamine at position 97, glutamine at position 99,

isoleucine at position 124, aspartic acid at position 219, isoleucine at position 230, and arginine at position 238, wherein the positions correspond to those in SEQ ID NO: 70.

45. The method of claim 44, wherein the plant is maize.
46. The method of claim 44, wherein the fungus is from the genus *Fusarium*.
47. A method of enhancing plant resistance to a nematode, the method comprising,
 - a) introducing into a plant a recombinant expression cassette comprising a promoter operably linked to a polynucleotide encoding a chitinase polypeptide having chitinase activity, wherein the polypeptide is selected from the group consisting of SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 22, SEQ ID NO: 24, SEQ ID NO: 26, SEQ ID NO: 28, SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 34, SEQ ID NO: 36, SEQ ID NO: 38, SEQ ID NO: 40, SEQ ID NO: 42, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 48, SEQ ID NO: 50, SEQ ID NO: 52, SEQ ID NO: 54, SEQ ID NO: 56, SEQ ID NO: 58, SEQ ID NO: 60, SEQ ID NO: 62, SEQ ID NO: 64, SEQ ID NO: 66, SEQ ID NO: 68, SEQ ID NO: 70, SEQ ID NO: 72, SEQ ID NO: 74, SEQ ID NO: 76, SEQ ID NO: 78, SEQ ID NO: 80, SEQ ID NO: 82, and SEQ ID NO: 84; and
 - b) selecting a plant with enhanced resistance to a nematode.
48. The method of claim 47, wherein the plant is soybean.
49. The method of claim 47, wherein the nematode is from the genus *Heterodera*.
50. A method of enhancing plant resistance to a nematode, the method comprising,
 - a) introducing into a plant a recombinant expression cassette comprising a promoter operably linked to a polynucleotide encoding a chitinase polypeptide having chitinase activity, wherein the polypeptide is selected from the group consisting of a polypeptide at least 90% identical to SEQ ID NO: 4, a polypeptide at least 89% identical to SEQ ID NO: 6, a polypeptide at least 91% identical to SEQ ID NO: 8, a polypeptide at least 88% identical to SEQ ID NO: 10, a polypeptide at least 91% identical to SEQ ID NO: 12, a polypeptide at least 89% identical to SEQ ID NO: 14, a polypeptide at least 87% identical to SEQ ID NO: 16, a polypeptide at least 96% identical to SEQ ID NO: 22, a polypeptide at least 90% identical to SEQ ID NO: 24, a polypeptide at least 89% identical to SEQ ID NO: 26, a polypeptide at least 92% identical to

SEQ ID NO: 28, a polypeptide at least 92% identical to SEQ ID NO: 30, a polypeptide at least 95% identical to SEQ ID NO: 32, a polypeptide at least 92% identical to SEQ ID NO: 34, a polypeptide at least 95% identical to SEQ ID NO: 36, a polypeptide at least 93% identical to SEQ ID NO: 38, a polypeptide at least 90% identical to SEQ ID NO: 40, a polypeptide at least 90% identical to SEQ ID NO: 42, a polypeptide at least 96% identical to SEQ ID NO: 44, a polypeptide at least 94% identical to SEQ ID NO: 46, a polypeptide at least 95% identical to SEQ ID NO: 48, a polypeptide at least 96% identical to SEQ ID NO: 50, a polypeptide at least 99% identical to SEQ ID NO: 52, a polypeptide at least 95% identical to SEQ ID NO: 54, a polypeptide at least 95% identical to SEQ ID NO: 56, a polypeptide at least 93% identical to SEQ ID NO: 58, a polypeptide at least 93% identical to SEQ ID NO: 60, a polypeptide at least 93% identical to SEQ ID NO: 62, a polypeptide at least 93% identical to SEQ ID NO: 64, a polypeptide at least 93% identical to SEQ ID NO: 66, a polypeptide at least 91% identical to SEQ ID NO: 68, a polypeptide at least 92% identical to SEQ ID NO: 70, a polypeptide at least 90% identical to SEQ ID NO: 72, a polypeptide at least 89% identical to SEQ ID NO: 74, a polypeptide at least 89% identical to SEQ ID NO: 76, a polypeptide at least 93% identical to SEQ ID NO: 78, a polypeptide at least 91% identical to SEQ ID NO: 80, a polypeptide at least 92% identical to SEQ ID NO: 82, and a polypeptide at least 91% identical to SEQ ID NO: 84; and

b) selecting a plant with enhanced resistance for a nematode.

51. The method of claim 50, wherein the plant is soybean.

52. The method of claim 50, wherein the nematode is from the genus *Heterodera*.

53. The method of claim 50, wherein the chitinase polypeptide has an amino acid sequence that, when optimally aligned with SEQ ID NO: 70 comprises one or more amino acid residues selected from the group consisting of serine at position 79, serine at position 83, valine at position 85, lysine at position 86, glutamine at position 97, glutamine at position 99, isoleucine at position 124, aspartic acid at position 219, isoleucine at position 230, and arginine at position 238, wherein the positions correspond to those in SEQ ID NO: 70.

54. The method of claim 53, wherein the plant is soybean.

55. The method of claim 53, wherein the nematode is from the genus *Heterodera*.